

Novelty Rejections - 35 U.S.C. § 102(b)

Claims 21, 23-26, and 48-51 are rejected in the Office action under 35 U.S.C. § 102(b) as anticipated by Lake, U.S. Patent No. 5,605,547. First, with respect to claims 26 and 51, Applicants contend that such rejections are improper. Lake does not teach a substrate having a plurality of electrical contact sites with a plurality of electrically conductive hard particles positioned on the substrate and a thin layer of metal plated on each of the electrical contact sites, wherein the thin layer of metal affixes the electrically conductive hard particles to the electrical contact sites. Lake discloses the use of an anisotropic adhesive containing particles. The impropriety of the rejection of claims 26 and 51 is further evident in view of the fact that claim 22, which claims a plated nickel layer affixing the hard particles to the contact sites, was merely objected to and would be allowable if written in independent form. Claim 22 is a specific embodiment of the structure claimed in claim 26. Claims 26 and 51, as amended, are now independent claims that are not anticipated by the references cited in the Office action. Allowance of these claims and of claims 94-99 and 101-110 depending therefrom is requested.

Second, Applicants assert that claims 21 and 48, as amended, are likewise not anticipated by Lake. Again, Lake discloses an anisotropic adhesive containing conductive particles. Lake does not describe these particles in any detail and there is no suggestion that the particles in the adhesive in Lake are hard particles as defined and claimed in the present application. Further, no adhesive is used to affix the hard particles of the present invention to the electrical contacts on the electrical component assembly or the printed circuit interconnection assembly. Because no adhesive is used, the resulting claimed structures of the present invention are significantly different from the component structures disclosed in Lake.

For example, the resulting surface of a component of the present invention is stable as compared to a surface whereby conductive particles are suspended in an adhesive. There are no handling requirements. There is no concern about transferring the adhesive to another surface, for example, when handling, packaging, and shipping the components. There is also no concern about a limited time to make a conductive connection using particles as compared to the cure time of the anisotropic adhesive of Lake. The particles of the present invention are the conductive path, but the fixation of the particles to the contact sites is wholly separate from any use of an adhesive. This is apparent in the fact that conjunction with adhesive components is claimed in dependent claims to claims 21 and 48. Therefore, the assemblies claimed in the present invention can be stored, shipped, and handled without concern with a

cure time of any adhesive until it is time for assembly of components using a non-conductive adhesive.

Applicants' contend therefore that the claimed invention as set forth in claims 21 and 48 is novel and not anticipated by Lake. Withdrawal of the rejection and allowance of claims 21 and 48 and related dependent claims 22-25, 27-28, 49, 52-54, 93, 100 is requested.

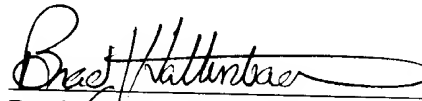
Obviousness Rejections - 35 U.S.C. § 103

The Office action rejects claims 53 and 54 as obvious in consideration of the combination of Lake and U.S. Patent No. 5,913,110 to Herbst. In view of Applicants' amendments and remarks above regarding the disclosure of Lake, Applicants contend that the rejections under 35 U.S.C. § 103 are moot. Withdrawal of the rejections to claims 53 and 54 is therefore requested.

CONCLUSION

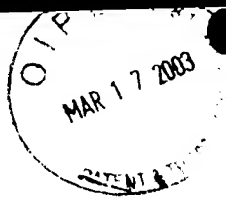
Applicants request entry of the amendments to claims as set forth herein and the inclusion and consideration of new claims 101-110. As the references cited by in the Office action do not individually anticipate or in combination render obvious any of the pending claims, Applicants request the withdrawal of the rejections to the pending claims and swift issuance all claims remaining in the application to patent.

Respectfully submitted this 17th day of March 2003.



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ATTACHMENT A

CLAIM AMENDMENTS - VERSION WITH MARKINGS TO SHOW CHANGES MADE

Additions are underlined and deletions are shown in ~~striketrough~~.

21. (Twice Amended) An electrical component assembly comprising:
- a) a substrate having a plurality of electrical contact sites on a surface thereof;
- and
- b) a plurality of electrically conductive hard particles positioned on the substrate, such that each of the electrical contact sites has at least one electrically conductive hard particle associated therewith, wherein

the at least one electrically conductive hard particle is affixed, without an adhesive, in direct contact with a conductive surface of its associated electrical contact site.

26. (Twice Amended) An electrical component assembly ~~as described in claim 23, further~~ comprising:

a substrate having a plurality of electrical contact sites on a surface thereof;
a plurality of electrically conductive hard particles positioned on the substrate; and
a thin layer of metal plated on each of the electrical contact sites, wherein
the thin layer of metal affixes the at least one electrically conductive hard particle to
the a conductive surface of its associated electrical contact site,
each of the electrical contact sites has at least one electrically conductive hard particle
associated therewith, and

the at least one electrically conductive hard particle is affixed in direct contact with
the conductive surface of its associated electrical contact site.

48. (Twice Amended) A printed circuit interconnection assembly comprising:
a printed circuit board substrate having a plurality of electrical contact sites on a surface thereof; and

a plurality of electrically conductive hard particles positioned on the substrate, such that each of the plurality of electrical contact sites has at least one electrically conductive hard particle associated therewith, wherein the at least one electrically conductive hard

particle is affixed, without an adhesive, in direct contact with a conductive surface of its associated electrical contact site.

51. (Twice Amended) A printed circuit interconnection assembly ~~as described in claim 48, further comprising:~~

a printed circuit board substrate having a plurality of electrical contact sites on a surface thereof; and

a plurality of electrically conductive hard particles positioned on the substrate

a thin metal layer plated on each of the electrical contact sites, wherein

the thin metal layer affixes the at least one electrically conductive hard particle to ~~the~~ a conductive surface of its associated electrical contact site,

each of the plurality of electrical contact sites has at least one electrically conductive hard particle associated therewith, and

the at least one electrically conductive hard particle is affixed in direct contact with the conductive surface of its associated electrical contact site.

95. (Amended) An electrical component assembly as described in claim-24 26, wherein each of the plurality of electrically conductive hard particles comprises a nonconductive hard particle core with an outer surface coated by a conductive material.

96. (Amended) An electrical component assembly as described in claim-24 26, wherein each of the plurality of electrically conductive hard particles comprises a diamond particle core with an outer surface coated by a layer of nickel.

101. (New) An electrical component assembly as described in claim 26, wherein the thin metal layer comprises a layer of nickel.

102. (New) An electrical component assembly as described in claim 26 further comprising an non-conductive adhesive material applied to at least selected portions of the surface of the substrate and the plurality of hard particles.

103. (New) An electrical component assembly as described in claim 102, wherein the non-conductive adhesive covers substantially all of the substrate.

104. (New) An electrical component assembly as described in claim 102, wherein the non-conductive adhesive covers selected portions of the substrate.

105. (New) An electrical component assembly as described in claim 26, wherein the substrate comprises a semiconductor chip.

106. (New) A printed circuit interconnection assembly as described in claim 51 further comprising a non-conductive adhesive applied to at least selected portions of the surface of the substrate and to the plurality of hard particles.

107. (New) A printed circuit interconnection assembly as described in claim 105, wherein the non-conductive adhesive covers substantially all of the substrate.

108. (New) A printed circuit interconnection assembly as described in claim 51, wherein the printed circuit board substrate comprises a flexible printed circuit board substrate.

109. (New) A printed circuit interconnection assembly as described in claim 51, wherein the printed circuit board substrate comprises a smart card chip module.

110. (New) A printed circuit interconnection assembly as described in claim 51, wherein the printed circuit board substrate comprises a smart label.